DEPARTMENT OF AGRONOMY
NEW JERSEY AGRICULTURAL EXPERIMENT STATIONS

American Potato Journal

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Potatoes remove from the soil more potash than both nitrogen and phosphoric acid combined. A yield of 300 bushels per acre uses 170 pounds of actual potash per acre in addition to what must be supplied to take care of leaching, erosion, and soil fixation.

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Potash Improves Cooking Quality

At the Rhode Island Experiment Station, research work over a period of four years established the relationship of potash to cooking quality of potatoes.

Potatoes from different plots, fertilized with varying amounts of potash, were boiled, mashed, and baked each year, and then judged by members of the Station staff. In the case of the boiled and baked potatoes, the results were highly in favor of the high-potash potatoes, because of increased mealiness. With the mashed potatoes, the high-potash lots always received more first places, but mashing made the difference less easy to detect.

Potatoes remove from the soil more potash than both nitrogen and phosphoric acid combined. A yield of 300 bushels per acre uses 170 pounds of actual potash per acre in addition to what must be supplied to take care of leaching, erosion, and soil fixation.

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'Aero' Cyanamid 22-0-0	...	...	...	...	100	100	...
Nitrate of soda 16-0-0	...	350	475	...	215	385	240
Sulphate of ammonia 20-0-0	100	100	...	380	100	...	100
Castor pomace 6-0-0	...	...	...	...	...	...	300
Nitrate of potash 12-0-44	470	...	...	...	...	...	...
Muriate of potash 0-0-50	150	560	510	560	560	560	560
Sulphate of potash magnesia	...	...	100	...	...	...	...
Dolomitic limestone	695	405	330	475	440	235	215
	2000	2000	2000	2000	2000	2000	2000
†Net basicity as $CaCO_3$	+365	+ 73	+144	−273	+130	+123	−161

† See Jour. Ind. Eng. Chem., Anal. Ed. Vol. 5, No. 4, p. 229, 1933.

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YOUR ORGANIZATION

The Potato Association of America is your organization. It is unique in that its membership comprises all interested in the industry, including producers, dealers and those interested in research. The chief aims of the organization are listed in this issue of the Journal by John Tucker. In addition to these it is obvious that one of the organization's important functions is to keep its members advised concerning the new developments in the industry. Just now there is considerable discussion concerning the desirability of some form of regulation for the industry. It is as important that the growers be acquainted with the developments along these lines as with the newest things in production and marketing. We may not agree that regulation is necessary but it is important that we know what is being discussed so that we can voice our approval or disapproval. We hope to keep you informed on these various questions through the pages of the American Potato Journal. It has been suggested that only popular articles be printed in the Journal and that all manuscripts of a research nature be reserved for publication in an annual proceedings, as was formerly done. We believe, however, that the progressive potato growers are as much interested in the research findings as are the research workers themselves and consequently it would seem desirable to retain the Journal in its present form. The Executive Committee is, however, very anxious to have the Journal serve the industry so that your suggestions as to how it may be improved will be appreciated.

The membership in the Association, by states, is reported in this issue of the Journal. It is true that this is a large increase over two years ago but the number enrolled is still pitifully small when one recalls that there are more than three million potato growers in the United States and Canada. Is this because the Association has not been properly called to the attention of the growers? This should be done since, with a larger membership much more could be accomplished for the industry.

American Potato Journal

Volume XII January, 1935 Number 1

PRESIDENTIAL ADDRESS[1]

JOHN TUCKER[2]

Central Experimental Farms, Ottawa, Canada

On this, the twentieth anniversary of the first annual meeting of the Potato Association of America, held at Cornell University, Ithaca, N. Y., on February 10-11, 1914, it would seem fitting that we review briefly our progress. The foresight of the members in placing on record, in the "Proceedings" of the first annual meeting, the objectives of this Association, enables us now to ascertain, relatively speaking, the state of the industry at that time, what has been done since, and, to some extent, what remains to be done.

These objectives, for which the Association was organized, were as follows:

The object of this Association shall be to bring together for mutual cooperation and coordination of effort all agencies interested in the production, transportation, distribution and utilization of potatoes, and the promotion of the potato industry in all its phases.

To create a general interest in better seed, true to name and free from disease.

To stimulate the development of new and improved varieties, possessing greater adaptability to special soil or climatic conditions; a higher starch content, greater productiveness, or marked immunity of vine or tuber to disease.

To provide for the proper description of varieties and the establishment of a bureau of registration and nomenclature for new and worthy introductions.

To encourage a system of pure seed certification through field inspection of the growing crop.

---

[1]Contribution: No. 417 from the Division of Botany, Experimental Farms Branch, Department of Agriculture, Ottawa, Canada. Presidential address delivered at the 21st annual meeting of the Potato Association of America, in session at Pittsburgh, Pennsylvania, December 27-29, 1934.

[2]Chief Inspector. Dominion Seed Potato Certification Service.

To assist in determining varietal adaptation through uniform varietal tests in all parts of the country.

To encourage the coordination of potato investigations by the United States Department of Agriculture and the State Experiment Stations.

To raise the standard of market requirements for table stock through more careful grading and packing, and better eating quality.

To stimulate the investigation of methods for the profitable utilization of surplus and cull potatoes.

To encourage measures designed to safeguard our American industry against the introduction of disease and insect pests.

To establish a more effective system of distribution and marketing.

To encourage the formation of cooperative growing and selling exchanges.

To promote an interest in potato contests and exhibitions.

To establish and maintain a system of crop forecasting for the mutual benefit of its members.

To collect and disseminate the best available information relating to both the practical and scientific phases involved in increased yields, coupled with a lessened cost.

Not more than a very brief comment on each item is possible without encroaching on valuable time which is required for the discussion on work to be done, but it is obvious that much real progress has been made. No mention of individuals responsible for this progress is attempted, their reward comes from knowing they have done their part well. Neither is it intended to convey the impression that the Association is responsible for all the progress that has been made although it is gratifying to know that our members have taken a leading part in many of the improvements now in effect.

Since the original program was initiated, it is evident that progress has been made toward co-operation and co-ordination of all agencies interested in the promotion of the potato industry; a more general interest in better seed has been created; the development of new and improved potato varieties is now under way and is receiving the attention of leading scientific plant breeders; a very satisfactory description of varieties has been provided, and provisions made for the registration of new varieties; a system of seed certification through field inspection has been established. Varietal adaptation to soil and weather conditions are generally well understood insofar as the recognized standard varieties are concerned. The co-ordination of some potato investigations by the Federal Department and State Experimental

Stations is in effect and others are under way. The standard of market requirements for table potatoes has been raised through the introduction of improved grades and packing; some investigations into the methods of profitable utilization of surplus and cull potatoes have been undertaken; measures have been taken to safeguard the industry against the introduction of disease and insect pests. More effective systems of distribution and marketing are in force; the formation of co-operative growing and selling exchanges has been encouraged; more interest is evident in potato contests and exhibitions, and a system of crop forecasting has been established. The best available information relating to both practical and scientific phases involved in increased yields, coupled with a lessened cost, has been made available to the members through the Association's official publication, the American Potato Journal.

This, in brief, indicates what has been done, but the fact that the industry at large is not on a satisfactory annual paying basis clearly indicates that there is urgent need for organization to correct this condition.

One of the principal problems of potato growers appears to be that of fitting the supply to the demand. The crop is short of requirements in some years and the price rises accordingly; in other years there is a large surplus and the price drops below the cost of production. These conditions are unsatisfactory to the industry. The trend appears to be toward more frequent surpluses and the individual grower is helpless to combat this trouble. Organization appears to offer the only effectual remedy possible. This would give the individual a definite idea of his economic position and assist the agricultural workers to apply sound practices to the problem.

This important industry is highly specialized and localized, the crop is costly and unsuited to haphazard methods of production. Economical production and marketing of high quality potatoes can be secured only from especially suitable and somewhat limited areas of high yield and not from the more scattered and unsuitable areas of low production.

The minimum acreage necessary to produce a sufficient quantity to fill the annual demands must obviously result in an oversupply in some seasons and a satisfactory outlet for this excess crop must be provided. The true value of potatoes for stock and poultry feeding should be made more widely known so that larger quantities than at present will be fed. In Germany, for instance, only about 30 per cent of the crop is produced for table purposes

and 40 per cent is used for stock feed, whereas about 60 per cent of the crop here is produced for table purposes and about 10 per cent for stock feed. The fact that the value of potatoes for feed purposes is determined by the value of substitute materials is not lost sight of, but it does offer an outlet for large quantities of lower grade potatoes in some years. Higher official grades could also be applied in years of excessive production, but possibly the factories producing potato by-products might act as the best safety valves in areas of intensive production if a proper system of annual supply could be guaranteed them. Guaranteed definite quantities under contract every year at a set price irrespective of what the market price may be, they could operate and once established on a sound basis could handle very large quantities when necessity arises.

The potato crop is grown in connection with other farm operations but not as a rotation crop, in many specialized areas. In this we differ from many European countries where the crop is not only of considerable commercial importance, but is also an important rotation crop. The value of rotation from the standpoint of disease control is recognized; the value of clovers as soil builders in the rotation is generally agreed upon, but the fact is that seed supplies of red clover, alfalfa and alsike are short of our normal requirements and even sweet clover and some of the grass seeds which ordinarily substitute for those previously mentioned when high in price, has advanced to much higher levels than for some years. Thus we have a situation in many districts eminently suited to the production of the soil building crops, where we have a glut of a soil depletion commodity which was produced at a high cost and is selling at below cost, and an actual scarcity of a profitable soil building commodity, which is produced at low cost, and is selling at profitable prices.

Time will not permit of more than brief mention of the creditable work of the plant pathologists in conjunction with the various seed certification authorities, assisting to maintain supplies of practically disease free seed of the principal commercial varieties, and sufficient for the requirements of the industry. The value of this work is evidenced by the fact that out of the hundreds of commercial varieties in production in North America when this Association was formed practically only those which have been certified, survive today. Diseases have eliminated many varieties completely and dozens of others have been discarded in favor of the

standard varieties which are procurable in quantity, certified as to purity of variety and freedom from disease.

This seed maintenance and improvement work must of necessity continue, at least until such time as the plant breeders, working in conjunction with plant pathologists and horticulturists, provide new disease resistant varieties of high quality, acceptable to the industry. Very promising results are apparent in this respect already. The Katahdin, Chippewa, and the Warba varieties have been released in recent years and we may expect others to follow, having remarkable resistance to some diseases. The enormous amount of patient scientific work on the part of the men engaged in this program of originating improved and disease resistance varieties is realized only by those in very close touch with the problem.

The papers to be presented at this meeting on potato breeding are of intense interest, as are the papers on potato disease and insect pest studies, marketing utilization and distribution problems, and all other phases of potato production and crop improvement work. These papers will be published in the American Potato Journal and should prove to be of value to all interested in the potato industry.

NATIONAL REGULATION OF THE POTATO INDUSTRY

HUGH B TABB

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The potato industry is in a bad spot. Only once in history have we been in a worse one. That was in 1932 when the greatest business depression of modern times was making its bottom.

The 1934 potato crop shows an increase of 20% over last season and the average United States prices show a decrease of approximately 40%. There is not a potato grower in the country who is getting back his out-of-pocket costs of production, and a great many of them are receiving less than half of their growing costs. Unless there is a change in the near future the present units of the industry are facing stark ruin.

Two years ago when the whole business and agricultural world were down in the depths we did not feel so much concerned about ourselves. It seemed then that our lot was the common lot of all. Now, that the general picture has changed so materially, however, and we find ourselves alone in the same old boat, it is time to take an inventory. Business has improved, employment has increased, Christmas buying has been the greatest since 1930, and wheat, corn, tobacco,

cotton, live stcok and various agricultural items are double or more than double the price of two years ago. Potatoes alone are practically unchanged. Something is wrong. Evidently we are out of step with the modern world.

The average price of potatoes on the farms of the United States, as of December 1, 1934 was 41.6 cents per bushel which compares with the depression low of 35.3 cents; 69.9 cents a year ago, 128.8 cents in 1929, and with 187.2 cents in 1925. Translated into actual cash prices to growers in leading states, the present price means 40c per barrel of 165 pounds in Maine, 30-35c per cwt. in Wisconsin, and 45-50c cwt. in Idaho.

The 1934 production was 385,287,000 bushels which was harvested from 3,303,000 acres. The production a year ago was 320,203,000 bushels from 3,196,000 acres. The total value of our present large crop is $160,000,000 and the value of the small crop a year ago was $223,880,000. Back in 1929 a crop of 329,000,000 bushels increased the wealth of the country by $423,896,000 and in 1925 a still smaller crop was worth nearly $600,000,000. The smaller the crop, the more wealth it brings to the industry, and the country at large.

There are approximately 2,900,000 farms in the United States that produce potatoes, and of these about 954,000 farms have more than one acre, and about 119,000 farms more than three acres.

Potatoes are an inelastic crop, in that the consumption does not rise and fall proportionately with the price. People are eating just about so many, whether the markets are high or low, and regardless of the quantity available. The tremendous increase in the production of winter vegetables in our Southern States and California during the past decade has seriously affected the consumption of potatoes. The eating habits of the country have changed and the demand for all starchy foods, particularly bread and potatoes, has been declining steadily.

Under these conditions the market price of potatoes is very sensitive to any variation of the size of the crop or the quantity of potatoes being offered for sale.Economic and business conditions enter into the picture from season to season, influencing price levels to some extent, but the big factor is the quantity of potatoes available for sale. This seems to be true whether the potatoes move to market or not. The mere fact that they are on tap, so to speak, discourages the trade and forces prices down to where distant producers cannot afford to move their holdings at all.

The potato industry has made great strides in many directions since the World War. Our Scientists and Agricultural Schools have

improved existing varieties and introduced advanced cultural methods and ways of overcoming disease and insect pests. Grading laws and official inspection have been established in many states, containers have been standardized and the spread between producer and consumer prices has been narrowed.

These improvements have been more than worth while. The production and distribution of potatoes have become more business like, but it must be admitted that all of these innovations are merely incidental when it comes to setting the price level from season to season. The old law of supply and demand still functions, and no way has yet been discovered to repeal it.

The profitable seasons during the past 15 years have mostly been when the United States acreage was close around 3,000,000 acres. When this acreage is increased 5% or 10% the result is usually too many potatoes and low prices. Weather conditions play quite a part, but our national potato acreage is scattered so widely that frequently the weather has a tendency toward equalizing itself, as during the past year.

Our Department of Agriculture began combating the tendency of the growers to over-plant about 11 years ago by issuing intentions-to-plant reports in January and March of each year. These reports have proved remarkably accurate. It would seem that growers would heed such reports in a national way and maintain their acreage on an even keel, but human nature is not built that way. They still jump into over-planting and over-production following the prosperous seasons just the same as they did before intentions-to-plant reports were ever thought of.

Conditions at the present time are worse and more discouraging than ever before. In the old days we did have the solace that every so often enough growers would go broke to bring the acreage down and give us a profitable season. This survival of the fittest was a harsh and cruel law, but it was the only cure. Now, it is being repealed.

Since the new Administration came into power on March 4, 1933 there have been a great many changes in agricultural policies in the United States. The Agricultural Adjustment Act was passed, in which such non-perishable crops as wheat, cotton, tobacco and others were named as basic commodities. This was followed by the compulsory Bankhead Cotton Bill and the Kerr-Smith Tobacco Act.

Then Production Credit Associations were established in all parts of the country. Any farmer, with acceptable security, may procure a loan for planting, cultivating and harvesting his crop. Something like 30% of the potato acreage in Maine last season was financed by

government loans. Mr. Myers, governor of the Farm Credit Administration said the other day that more than $100,000,000 have been loaned by Production Credit Associations to about 125,000 farmers. Potato growers, as a rule, will be unable to meet their loans this season and will be back for more credit next spring.

I am not criticising this policy of the Administration. It is simply one of the developments of the 1929-1935 world-wide depression. We must face the fact, however, that these government loans are doing away with our old time checks and balances on the expansion of our potato acreage from year to year. In other words we can no longer depend upon a bad season or two, sufficiently reducing acreage to insure a good season.

The Credit Associations could, of course, insert a clause in the loan papers requiring the borrower to reduce the acreage of certain crops but this has not worked out satisfactorily in the past. Further, there are indications that private capital will soon be more freely available. Then there are the large growers who always finance themselves, and various financial interests who promote share planting and various forms of miscellaneous credit. If the Credit Associations crack down on the little fellows, the big fellows will increase proportionately, or more so.

The Agricultural Adjustment Administration is doing everything in its power to give agricultural commodities a purchasing power equal to that of the base period of 1909-1914, all costs considered, and with liberal assistance on the part of nature during the past season, all basic commodities are much higher than a year ago, or two years ago. Potatoes are the only major crop in the country that are lower in price.

Under such conditions it is natural that strong agitation is springing up in all parts of the United States for the Administration to do something for the potato industry. Cotton farmers, tobacco farmers, wheat farmers, corn-hog farmers and others are prosperous, while we potato men are facing disaster.

Government regulation of agriculture has become an established policy. This fact must be faced and accepted, and there is no use arguing about it. Recognizing this, the question arises, can any major farm industry follow old time methods and continue to survive? I do not believe there has been much switching from regulated crops to potatoes so far, except in the South, but the temptation is there and it will come.

Marketing agreements were provided for in the original Agricultural Adjustment Act for non-basic crops. A number of these

Agreements are now in effect covering various commodities in nearly all parts of the country. They provide for Control Committees representing both growers and shippers, and for proration of shipments. The principal weakness in them is that they are entirely voluntary as to producers, and they carry no provision for national coordination. Such Agreements are now before potato growers and dealers in all the Southern States.

A great many potato growers and dealers, particularly in the South where the Cotton Bill and the Tobacco Act are in effect, are asking that potatoes be made a basic commodity. This would require new legislation and the situation is being closely studied at Washington. The fact remains, however, that merely making potatoes a basic commodity does not add anything of a compulsory nature. All signatures to production control contracts are voluntary and are subject to the same limitations as the Marketing Agreements. The compulsory control over cotton and tobacco is provided for in separate Acts.

The principle, back of basic commodities, is that the government will collect what is now termed a processing tax which is passed on to the consumers in the way of higher retail prices. The proceeds of this tax is then paid to farmers signing production control contracts as recompense for their retiring a part of their acreage.

Such a plan would be difficult with potatoes which are not processed anywhere along the line. Potatoes go to the consumers in their original form, and only about 30% of the crop even moves in a carlot way. In the first place, I do not see how a heavy processing tax could be collected uniformly on potatoes; secondly, such a tax would increase retail prices; and thirdly, I cannot see the logic of bribing a man to let you help him out of the mud hole into which he has fallen. At the moment I cannot see where the basic commodity principles, now being applied to wheat and some other crops would solve our potato problem. Likewise, I cannot see Congress passing a law similar to the Cotton and Tobacco Acts for a crop embracing only a little over 3,000,000 acres which is scattered over 48 States.

I am convinced, however, that something must be done. Our old time laizzez faire policy is leading us to ruin. The Administration is friendly disposed toward us and it is simply a question of our meeting them half way with open arms, or wallowing in our own mire.

The most feasible plan, it appears to me, is to go along the

road the Administration has already partially built, or in other words, to work through new and revised Marketing Agreements supported by such additional legislation as is necessary to effect 100% control. I take it that any proposed plan must be broad enough and deep enough to embrace the potato industry of the United States. The Southern States alone, can never get very far under any scheme unless the remainder of the country cooperates.

It is not my province to suggest just how the Agricultural Adjustment Act should be amended, or what additional laws should be passed by Congress. There are men at Washington who can figure these things out a lot quicker than we potato men can, but I do have in mind that the proposed new legislation should be broad enough to cover not only potatoes, but all crops not already named as basic commodities.

Some of the principles, which I believe should be observed in formulating our national potato plan are as follows:

1. It must be a plan that appeals to the overwhelming majority of the potato producers of the United States. No law or set of laws can be enforced unless it has public opinion behind it. We do not want another Eighteenth Amendment. The best interests of all sections of the country must be provided for. The plan must be self-regulating and self governing, with a minimum of government interference and direction. Administrations come and go, but the potato industry goes on forever. My thought is, that the major assistance we require from the Government is sufficient authority to force us to be honest with ourselves. In other words, to make it tough for the chiselers.

2. There must be local government for the producing districts whose conditions and interests are closely in common, and there must be national coordination, linked to the Department of Agriculture.

3. Compulsory acreage control should be avoided as a national policy if possible. We are dealing with an important food crop which is perishable in nature, and cannot be carried over from season to season. We do not want to risk either famines or famine prices. Growers might vote for acreage control in the present emergency, but they would soon rebel. Many of them use potatoes in crop rotation schemes, and all of them like to gamble on weather conditions in other parts of the country.

4. The principles embodied in the California Agricultural Pro Rata plan seem to be the nearest in accord with advanced thought and practice. They are already recognized by the Administration

in the present Marketing Agreement forms. The crop is just simply cut to fit the existing demand after it is produced. To this should be added that other principle of our Marketing Agreements whereby the growers are advised, before planting time, the approximate quantity of potatoes that there will be a demand for at a reasonable price, during the coming season. This would enable them to make such adjustments in their acreage as they felt advisable, and should become a potent influence in acreage control.

5. All growers of consequence should be registered or licensed, the same as dealers, cooperatives, commission men and all handlers of potatoes. Only a small portion of the acreage in the 30 Late States is controlled by or under contract to dealers or cooperative agencies. The growers raise their crops independently, and sell to whom they please. It would be impossible to make dealer allotments. It is the dealer who offers the most money from day to day who gets the largest volume. Each grower should be given a Certificate covering the quantity of potatoes he is entitled to sell, and both he and the dealer be required to keep complete records.

6. Truck merchants or peddlers, dealers buying or distributing potatoes by motor truck, and all growers selling their own produce direct must be brought into the picture, and placed under license and control. Such states as New York, Pennsylvania, Ohio and various others market practically all their potatoes by truck. Michigan, Wisconsin, Minnesota and others are moving fifty per cent or more by truck this season. It would be manifestly unfair to regulate carlot shipping states and districts if the trucking states are to be left running wild.

7. Allotment Certificates to growers should be transferable. The unfortunate grower whose quality may be poor due to no fault of his own may then sell his certificate to his more fortunate neighbor for more than his own potatoes will bring on the market. I question the advisability of basing Allotment Certificates on grades. Such a policy would penalize many states and many growers, and even the most favored districts have their off years. We must not forget the forgotten man.

8. Any national potato plan must be self-supporting, and not a perpetual drain on the United States treasury. Our annual potato crops vary in value from $126,000,000 to more than $500,000,000, and with so many millions of dollars involved between a fair price and a ruinous price every producer can well afford to contribute his mite. My thought is that each National District

determine an assessment in mills or cents per hundred weight and that all handlers or purchasers be required to deduct this assessment from his settlements, and remit the total monthly to his central authority.

9. Producers must be protected against exploitation on the part of the dealers and handlers of their crops. Only customary and usual commissions or margins of profit may be charged.

10. The enabling Amendment or Laws passed by Congress should contain the provision that when two-thirds of the producers, or two-thirds of the acreage in any National Potato District requests this or some similar, or I might say, any plan of regulation or control, the Secretary of Agriculture be authorized to declare it effective as to all producers and handlers of potatoes of whatsoever nature or kind. This is the only measure of compulsion that I have in mind, and suitable penalties for non-compliance or infringement should be provided.

Now, getting down to brass tacks with the foregoing principles in mind, a workable set-up for the potato industry of the United States would seem to be about as follows, in skeleton form.

A. Divide the United States into approximately Nine National Potato Districts, namely:

1. Maine and New England.
2. New York, New Jersey and Pennsylvania.
3. North Central States from Ohio to Iowa and the Dakotas.
4. The Southeast from Maryland to Florida.
5. The Gulf States from Alabama to Texas.
6. The Southwestern States of Kansas, Missouri, Oklahoma and Arkansas.
7. Nebraska, Colorado and Wyoming.
8. Idaho, Utah and Montana.
9. The Pacific Coast States.

B. Provide Marketing Agreements similar in form for each National District providing among other things the following.

1. Registration or licensing of all growers producing two or three acres or more of potatoes.
2. Licensing of all handlers of potatoes including dealers, truckers, or growers marketing their own produce.
3. Provide for a District Control Committee to be selected by licensed growers and dealers, with power to select its own officers and function through an executive committee for every day purposes.

4. Sectional Proration Committees for each producing district.

C. Establish a National Potato Stabilization Committee selected by the various district control Committees.

D. Select a National Potato Coordinator who must be approved by the Secretary of Agriculture and elected by a three-fourths vote of the National Potato Stabilization Committee. This Coordinator shall attend all meetings of the National Committee, such District meetings as become advisable, and shall represent the Secretary in such matters as the Secretary may authorize him to act. Otherwise he is under the direction of the National Committee.

E. The office and duties of these Committees and of the National Potato Coordinator are suggested by their titles and are in most respects outlined in detail in existing Marketing Agreements. Suffice to say that the National Committee would make tentative allotments for the Southern States early in the Fall, and for the Late States some time in February or March. The District Committees would then function within their respective Districts. I have already outlined the principles and methods of control, allotments, and prorations that seem the most feasible and effective.

F. The expenses of the National Committee will be assessed to the District Committees, who in turn will assess their respective producers for both local and national expenses of regulation.

This, in brief, seems to cover the general outlines of the national potato stabilization plan that I have in mind. Time and space make it prohibitive that I go into the thousand and one details that must be worked out in order to make it a complete success.

I do not claim originality. In fact I have borrowed from every available source in an effort to weld something practical together that will embrace the entire potato industry of the United States. I have subjected all of these ideas to the crucible of experience, and frankly I cannot see any unsurmountable difficulties.

Some will say there are too many potato growers and too much territory for any plan of national regulation to be made effective. To these my suggestion is that the Treasury Department experiences little trouble in enforcing the Income Tax laws of the country and they handle millions of Tax returns each year. Others will say that regulation will be evaded and potatoes will be bootlegged. I am sure these very things will happen, but who wants to repeal our laws against murder, arson or robbery just because they are broken every day. And then, once the potato men of the

United States are sold on regulation it will be mighty unhealthy for any one to become a slacker.

Now, in conclusion, I will say, there is one thing certain—we cannot be any worse off than we already are. Something must be done or the government will have to start building more poor houses. There must be a way out of the wilderness, and I have faith that the combined wisdom and good sense of the potato industry will find it.

THE RELATION OF SPRAYING AND DISEASE-FREE SEED TO HIGH YIELDS IN PENNSYLVANIA

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Nineteen thirty-four marks the tenth year during which definite records have been kept on high acre potato yields in Pennsylvania. It seems fitting that these records should be summarized at the end of the tenth year and some of the more striking results presented at this time. In studying the early literature on potato culture in Pennsylvania, I find high or record yields recorded as early as 1852. Such records at this early date are, however, decidedly few in number. The period from 1900 to 1905, often referred to as the years of the "great potato boom" is productive of many records, especially on newly developed varieties. It was not, however, until 1922 when Dr. E. L. Nixon conceived and started "Pennsylvania's 400 Bushel Club" that a systematic and complete record of high yields was kept. Three years later, 1925, definite records on the practices and methods by which these record yields were grown were begun. We have then the period from 1925 to 1934 inclusive as the ten year period for summarization and study. This particular summary and study will be confined to the relation of spraying and disease-free seed to these high yields.

I might be challenged in saying that thorough and timely spraying is more vital to the potato industry of Pennsylvania than it is to the industry of any other state. We have in times past been questioned as to the efficacy of our recommendations in Pennsylvania as to materials, methods, number of applications and as to the pressure at which the sprays are applied. These recommendations were founded or established largely on the basis of observation, trial, and practice, but with results in favor of the potato grower as the goal, we in Pennsylvania do not feel that we have been far off the course, especially for our Pennsylvania conditions. Recognizing that elevation, temperature, precipitation, length of growing season and varieties influence the effective-

ness or results of spraying, we have stated that there can be no set rule as to the number of applications required. In a general way, 10 to 12 applications have returned the greatest profit. Even under our most favorable conditions less than eight sprays have never given the most profitable returns. Under adverse conditions, as high as sixteen applications have proved to be economical. With these wide variations within a state, it is reasonable to assume that there are still wider variations as to climate, temperature, precipitation and varieties between more distant areas or the different states with possibly similar variations in the requirements as to spraying practices.

Influence of Spraying

That spraying has been widely adopted in Pennsylvania is evidenced by the 12,000 sprayers now in use. We have no *bona fide* commercial growers attempting to produce potatoes without spraying except a small number who are dusting. A difference of 50.3 bushels per acre on 35 demonstrations in favor of spraying over dusting is the reason we have not been enthusiastic about dusting in Pennsylvania. Results in recent years are even more in favor of spraying than in earlier years. The demonstrations in 1931 showed a difference in favor of spraying of 50.7 bushels per acre; in 1933, 82.6 bushels, and in 1934 the difference was 98 bushels in favor of spraying. During the thirteen years, 1922 to 1934, that the "400 Bushel Club" has been in existence only 3.2 per cent of the membership have used a dust. It is significant that over this period of thirteen years, with eight to ten times as many farmers eligible to the club who neither sprayed nor dusted as those who did spray, that only three qualified with a 400 bushel yield. Yet many of these farmers must have planted on good soil and practiced reasonably good culture.

Results of potato spraying demonstrations in Pennsylvania

1918-1934

Year	*Number Demonstrations*	*Av. Increase Yield per Acre*	*Av. Per cent Increase Yield per Acre*	*Av. Number Sprays Applied*
1918-1922	1423	58.5	39.9	5.8
1923-1927	868	88.5	51.0	8.1
1928-1932	331	93.1	53.9	11.5
1933	45	121.9	67.7	10.1
1934	46	94.5	36.0	10.2
1918-1934	2713	83.3	48.6	8.6

The results from spraying throughout the state are evidenced by the records of the past seventeen years. The average increase in yield on 2713 spray demonstrations during these years has been 83.3 bushels per acre. The increase on 771 demonstrations during the past ten years has been slightly over 100 bushels per acre. These results have been almost as consistent in years of drought with no late blight as in years of blight epidemics. The past season was not a bad blight year in Pennsylvania, yet the difference in favor of spraying on 46 demonstrations was 94.5 bushels.

That spraying has played a major part in the growing of Pennsylvania's high yields is not questioned. This does not belittle or detract from the importance of good seed, proper cultivation, humus and fertility in the soil, but adds greater significance to their importance.

Influence of Disease-free Seed

It is a matter of the past but of definite record that in 1918 over 50 different varieties of potatoes were commonly grown throughout Pennsylvania. Many of these varieties were no longer productive but were continued for the want of something better. Disease-free seed and potato disease control were in the early stages of evolution as far as Pennsylvania was concerned. Even the leading growers had not accepted the disease theory of the seed problem. Dr. D. D. Fritch of Macungie, Lehigh County, who was recognized at that time as a leading potato grower, not only in this state, but throughout the East, talked in terms of weak hills and frizzle tops, but was at a loss to solve the problem. The common practice was to exchange seed from farm to farm. In 1919 Dr. Fritch planted half of his 65 acres with disease-free seed and the remainder with his own seed. It is a matter of record that the difference in yield was 143 bushels to the acre in favor of the disease-free seed. Three other demonstrations in the same year showed similar results. In 1928, fifty-eight demonstrations were placed in the leading potato growing sections and showed 66.7 bushels in favor of the disease-free seed. In 1921, 289 demonstrations showed a difference of 69.4 bushels and in 1922, 730 demonstrations showed a difference of 47.7 bushels. After ten years, 1919 to 1928 inclusive, 2211 demonstrations had been conducted with a difference of 61.5 bushels per acre in favor of the disease-free seed. The distribution of disease-free seed had increased each year until in 1928, when 377 growers qualified for the "400 Bushel Club," over 300,000 bushels were being distributed annually to growers throughout the state.

Results of demonstrations comparing disease-free Seed and Home-Grown Seed in Pennsylvania

1919-1934

	Number Demonstrations	*Av. Increase Yield per Acre*	*Av. Per cent Increase Yield per Acre*
1919-1928	2211	61.5	30.9
1929	34	67.4	38.8
1930	38	47.2	34.1
1931	41	44.4	20.2
1932	45	36.0	16.5
1933	36	22.6	8.6
1934	41	21.0	6.5
1919-1934	2446	51.2	25.4

That this seed and its progeny would play a leading part in the production of high yields in Pennsylvania was inevitable. A summary of the "400 Bushel Club" shows that 98.2 per cent of all the members used disease-free seed or one year progeny of this seed.

Twelve hundred seventy-one applications for "Pennsylvania's 400 Bushel Club" have been received since 1922. Two hundred twenty-seven of these members have reported a "500" bushel yield and 30 reported "600" bushel yields. Since the collection of data on the different practices employed in growing these yields was begun in 1925, we have records on the following number in each group: 1170 making 400 bushels; 219 making 500; and 28 making a yield of 600 bushels to the acre. The State record yield was made by H. J. Walton and Sons of Chester County in 1928 with a yield of 696.17 bushels on a measured acre.

Number of Sprays, Pressure and Length of Growing Periods

For the comparative study of spraying methods the "Club Members" were grouped as follows: all members of the club or those making over 400 bushels to the acre; those making over 500 bushels; those making over 600 bushels; the ten highest yields, and the state record yield. The number of sprays, the pressure at which they were applied and the length of the growing period show a direct progressive relationship. The average number of sprays applied by all members of the club was 10.1. The 219 yields of over 500 bushels received an average of 11.7 applications and the

28 yields of over 600 bushels 13.3 applications. The least number of sprays applied by any grower making a yield of 600 bushels was ten.

The average spraying pressure used by all members of the club was 302 pounds while that of the 500 members was 345.1 pounds. The men making the ten highest yields used an average pressure of 360 pounds while Mr. Walton in making the state record yield applied 13 sprays at a pressure of 400 pounds.

The growing period, (the number of days from date of planting until death of the tops) shows almost a uniform progression from 143 days for all members of the club to 172 days for the state record yield. Two growers reported a growing period of 181 days and it is significant that their yields were 646 and 648 bushels to the acre respectively.

Number of sprays, pressure, and length of growing period in relation to high acre potato yields in Pennsylvania

1925-1934

Group	*Average Number Sprays*	*Average Pressure*	*Average Number Growing Days*
400 Yields	10.1	302.0	143
500 Yields	11.7	345.1	147
600 Yields	13.3	347.6	157
10 High Yields	14.6	360.0	166
State Record Yield	13.0	400.0	172

These summaries of the practices of the "400 Bushel Club" should not be construed as furnishing the basis on which conclusions for future methods and practices will be drawn. As a matter of fact they are intended to prove the efficacy of the teachings which preceded the conception and organization of the club. The evidence shows that there would be no "400 Bushel Club" in Pennsylvania without a disease control program of good seed and proper spraying. The teachings and practices underlying the club have been so widely adopted that complete records are no longer kept and the production of 400 bushels to the acre has become the common accomplishment. This ought to be sufficient evidence as to the value of a disease control program in the general field of agricultural education.

SIZING SEED POTATOES FOR PLANTING WHOLE

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During hot, dry, windy weather it is practically impossible, in Ohio, to obtain good stands of potatoes from freshly cut seed. This is partly due to deterioration of the seed in warm storage prior to planting, but more frequently it results from exposure of the freshly cut surfaces to the sun and wind during planting

The simplest method of solving this difficulty is by the use of small, whole seed. Because the weather of late May and early June has been peculiarly severe in Ohio the past three seasons, and cut seed has so frequently failed to give good stands, the demand for small, whole potatoes has been rapidly increasing. Experience has shown that the small tubers from certified fields are satisfactorily free from disease and do not produce an excessive number of plants per hill. A few years ago small seed sold at a discount, but the price has been rising in Ohio until it is now practically the same as that of the regular certified grade. The fact that whole seed insures good stands and saves the labor of cutting, may, in the future, raise the price above that of the No. 1 grade.

The chief objection to planting the present grade of small seed is that the tubers average somewhat too large; it takes about 27 bushels of seed per acre (planted 32 by 12 inches), whereas with cut seed 20 to 22 bushels are sufficient. Opinion varies somewhat as the proper size of seed, whether whole or cut, but the concensus tends toward an ounce as being an economical size. An ideal size for planting whole, then, would include the tubers ranging from 1 to 2 ounces. All tubers over 2 ounces could be economically cut. The actual weight of the tubers of the present small grade ranges from 1.2 to 2.4 ounces in Rurals and Cobblers. Thus the grade includes some tubers that should be cut, and fails to include some small tubers that would be suitable for planting whole.

A TEST OF VARIOUS SIZED GRADER BELTS

To determine in a practical way what screens might be used to obtain seed potatoes ranging from one to two ounces, some standard grading belts were purchased and others borrowed from the Boggs Manufacturing Company. Small tubers of both Cobblers and Russet Rurals, about three bushels of each, were screened through these sizing belts. Three hundred tubers were taken as

a sample from each size, and the 30 largest and the 30 smallest were weighed. This procedure gave an average weight of the largest 10 per cent which passed through each screen and the smallest 10 per cent retained. The data are given in terms of grams and also in approximate ounces in table 1.

Table 1. *Results of sizing small potatoes with a Boggs Grader*

Openings in Grader Belt Inches	Irish Cobblers				Russet Rurals			
	Small Tubers Retained		Large Tubers Passed		Small Tubers Retained		Large Tubers Passed	
	Grams	Oz.	Grams	Oz.	Grams	Oz.	Grams	Oz.
1⅞	64	2.2	68	2.4	59	2.1	63	2.2
1¾	53	1.9	56	2.0	50	1.8	53	1.9
1⅝	43	1.5	45	1.6	41	1.4	44	1.6
1½	35	1.2	36	1.3	34	1.2	36	1.3
1⅜	29	1.0	31	1.1	28	1.0	29	1.0
1¼	24	0.8	25	0.9	24	0.8	25	0.9

The 1⅜ inch belt retained most of the tubers weighing over an ounce, while the 1¾ inch retained most of those weighing two ounces. These two screens, then, would separate a grade which could be economically planted whole. It will be noted that they are just ⅛ inch smaller than the belts now commonly used.

Practical Sizes for the Small Grade

As long as seed potatoes continue to be graded according to table stock standards the 1⅞ inch screen will continue to be used for screening out the small size of round varieties. It is obviously impractical for the producer or dealer to regrade over a 1¾ inch screen, because there is not likely to be sufficient premium to cover the expense of handling two small grades. Until special seed grades are adopted the small grade will continue to have a 1⅞ inch maximum, and the responsibility of regrading will devolve upon the purchaser.

On the other hand, there is no economic reason why the minimum size of the small grade cannot be reduced from 1½ to 1⅜ or even 1¼ inches. Although, from the data given here, the 1⅜ inch screen would separate tubers at about the ounce size, actual experience with whole

seed screened to 1¼ inch, has been generally satisfactory. The 1¼ inch minimum would find favor in Ohio. It should certainly meet with favor in the districts supplying seed for Ohio, because it would increase the volume of a readily salable size with no additional expense, and eliminate the very small grade (tubers less than 1½ inch) which is now being sold in a limited way. By properly labeling the tags, "1¼ inches to 1⅞ inches," the grade would be eligible for federal inspection.

THE PRICE SITUATION

The following report was released on January 15 by the Bureau of Agricultural Economics of the United States Department of Agriculture: Large supplies of potatoes remaining in warehouses in producing sections have tended to hold prices fairly stable at low levels during recent weeks. These large stocks, together with new supplies coming from the early Southern States, are expected to cause prices to remain at or near the present levels during the next few months.

The final estimate of the 1934 potato crop is 385,287,000 bushels, which is practically the same as the crop of 1924. Based upon December farm prices, the large 1934 crop is valued at close to $160,000,000 compared with a value of the comparatively short crop of 1933 of nearly $224,000,000.

The only important changes from the November preliminary report were a slightly increased production in the Central States and a further reduction in the West. The Western States with only 54,000,000 bushels had the shortest crop since 1924, while the eastern late-potato states with 133,000,000 bushels broke all previous records. The central late states had an average sized crop of 125,000,000 bushels. During the last ten seasons, the 30 late potato states together had a heavier crop in only 1928.

Shipments by rail and boat from the 18 surplus producing late states amounted to only 69,500 cars by the end of December, compared with 73,000 at the same time in 1933. More potatoes are being moved to market by truck this season than in 1933 because of the larger proportion of the supply being located nearer the market centers and the lower prices. Recent weekly output also has been averaging one-third lighter than movement a year ago. The extent of the development of the trucking movement is indicated by a comparison of this season's rail movement with that of the 1924-25 season when the potato crop in the late states was about the same as it is this year. To January 1,

1925, total shipments via rail and boat amounted to 88,000 cars, whereas to January 1, 1935, only 70,000 cars were so moved. The average December farm price in 1924 was around 65 cents per bushel, as against the recent level of 45 cents.

A very slight improvement occurred in potato prices during early January this year. The New York jobbing market on eastern stock averaged around $1.02 per 100 pounds sacked, compared with $1.00 the month before and $2.17 in early January of 1934. The light arrivals of new Florida Bliss Triumphs were selling in New York on an l. c. l. basis at $3.00-$4.00 per 100 pounds, as against $4.00-$4.50 a year ago. The Chicago carlot market had strengthened slightly to about 85 cents per 100 pound sack of round whites, but this was low when compared with a level of $1.54 at the same time last season. Even Idaho Russet Burbanks, which are in light supply, recently touched only $1.65 in Chicago, as against a top of $2.00 a year ago.

Sacked Green Mountains at Presque Isle, Maine, still averaged around 42 cents per 100 pounds f. o. b. in the first week in January, compared with $1.43 at this time last season, and growers in Maine were receiving only 40 cents bulk per barrel. In the western New York district, round whites brought mostly 56 cents per 100 pounds sacked in early January, the same as in December. A year ago shippers there were getting about $1.45. The f. o. b. price around Waupaca, Wisconsin, held close to 58 cents on a usual terms basis, but that was 70 cents below the level of a year earlier. Russet Rurals in Michigan had advanced slightly to 60 cents per 100 pound sack, f. o. b. shipping point, but they were about 95 cents lower than in early January, 1934. Russet Burbanks in southern Idaho also strengthened slightly to about 74 cents per 100 pound sack, cash track in carlots, as against $1.02 a year ago.

The average United States farm price on December 15 had declined to 45.4 cents per bushel, or one-half cent below the November price and 3½ cents below the mid-October level. On December 15, 1933, growers received an average of 69.4 cents per bushel, and the December, 1910-1914, average was 61.1 cents.

REPORT OF THE TWENTY-FIRST ANNUAL MEETING OF THE POTATO ASSOCIATION OF AMERICA

A number of extremely interesting papers were presented at the annual meeting, held at Pittsburgh, December 27 to 29, 1934. These papers will appear in the American Potato Journal.

The following officers will serve in 1935:

President—John R. Tucker, Central Experiment Farms, Ottawa, Canada.

Vice-President—H. O. Werner, College of Agriculture, Lincoln, Nebraska.

Secretary-Treasurer—Wm. H. Martin, Agricultural Experiment Station, New Brunswick, New Jersey.

Executive Committee—

E. L. Newdick, Maine Department of Agriculture, Augusta, Maine.

Julian C. Miller, Agricultural Experiment Station, Baton Rouge, Louisiana.

Report of the Secretary-Treasurer

The Potato Association of America now has 887 members, an increase of 383 over 1933. The membership by states in 1934 was as follows:

Alabama	2
California	17
Colorado	19
Connecticut	11
Delaware	3
District of Columbia	8
Dominion of Canada	29
Florida	5
Foreign	34
Idaho	3
Illinois	4
Indiana	14
Iowa	9
Kansas	1
Kentucky	8
Louisiana	3

Maine	36
Massachusetts	7
Maryland	10
Michigan	12
Minnesota	18
Montana	4
Missouri	2
Mississippi	1
New Mexico	1
Nebraska	7
Nevada	1
New Hampshire	3
New Jersey	206
New York	219
North Carolina	3
North Dakota	9
Ohio	34
Oregon	3
Pennsylvania	29
Rhode Island	3
South Carolina	1
South Dakota	2
Tennessee	1
Texas	2
Utah	1
Vermont	8
Virginia	3
Washington	10
West Virginia	10
Wisconsin	14
Wyoming	1
Complimentary	46
Total	887

The eleventh volume of the American Potato Journal contains 354 printed pages, or 93¼ pages more than comprised volume 10. It is of interest to note also that a total of 98 advertisements were run in the Journal during the past year. These made up a total of 66 pages, an increase of 2¾ pages over 1933.

At this time the Editor wishes to express his appreciation to the

contributors to the Journal. There is no question but that there has been an improvement in the type of papers submitted for publication. The Editor wishes also to thank the writers of the sectional notes. These have apparently been very much worth while since numerous comments have been received concerning them. It is very much to be hoped that the sectional notes will be continued.

Statement of Accounts December 20, 1933 to December 20, 1934.

RECEIPTS

Balance from 1933	$31.12
Received from Michigan Bank	119.15
Annual Dues	1018.51
Sale of Advertising Space	1007.29
Miscellaneous	103.99
Total Receipts	$2280.06

EXPENDITURES

Printing and Mailing—(Dec. to Oct. incl.	$1117.87
Other Printing and Miscellaneous	157.04
Secretarial Work	515.00
Stenographic Services	148.20
Stamps and Stationery	249.45
Total Expenditures	$2187.56
Bank Balance	$92.50

ACCOUNTS RECEIVABLE

Sale of Advertising	$204.16
Reprints and Miscellaneous	38.65
Michigan Bank	145.63
Total Accounts Receivable	388.44

Respectfully submitted,

WM. H. MARTIN.

Auditing Committee

We, the undersigned Auditing Committee, have examined the books of The Potato Association of America and have found them to be in good order.

Fred H. Bateman,
John S. Gardner,
H. R. Talmage.

Resolutions Committee

This Committee brought in the following report, which was adopted by the Association:

1. Resolved, That there is great need for new potato varieties possessing disease resistance, good cooking and market quality together with large yields. Results to date show great progress, and demonstrate that such qualities can be obtained in potatoes. The Potato Association of America hereby urges the authorities concerned to continue and extend potato breeding work.

2. Resolved, That The Potato Association of America expresses its appreciation to the Carnegie Institute of Technology and the University of Pittsburgh for the excellent facilities furnished for the 1934 annual meeting.

3. Resolved, That we commend the Secretary-Treasurer, Dr. William H. Martin, for the indefatigable manner in which he has performed the duties of his office.

4. Resolved, In view of the fact that the market prices for the potato crop of 1934 have been ruinous to growers over large areas, we urge the study of new marketing methods for the crop.

5. Resolved, That since misconceptions exist concerning the dietetic value of the potato, The Potato Association of America recommends a program for the education of the public concerning its true food value.

6. Resolved, That The Potato Association of America extends kindest regards to E. V. Hardenburg and C. L. Fitch and hopes that the condition of their health is so improved that they will be in atetndance at the 1935 meeting.

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American Potato Journal

PUBLISHED BY

THE POTATO ASSOCIATION OF AMERICA

SOMERVILLE, N. J. NEW BRUNSWICK, N. J.

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E. L. NEWDICK.....Department of Agriculture, Augusta, Me.
JULIAN C. MILLER.....Agr. Exp. Sta., Baton Rouge, La.
H. R. TALMAGE.....Riverhead, Long Island, N. Y.

PRODUCTION CONTROL NECESSARY

As the result of over-production in 1934, potatoes may now be purchased at a price which does not defray production costs. The potato growers have no desire to make the price of potatoes prohibitive but they are convinced that the consumer is willing to pay a price which will at least ensure a living wage to the producer.

It is true that the potato growers themselves are partly responsible for their present difficulties. They appreciate that over-production is certain to result in low prices but, as individuals, they are unable to prevent it. Various methods have been employed to prevent this situation. It was thought, for example, that acreage reductions would follow if the inefficient growers were starved out. This system has not worked in the past and it is doubtful if it will work in the future. Reduction by mutual agreement has also been attempted. This method also has seldom been successful. In too many cases the only outcome of a move of this kind was an increase in acreage. It has been suggested also that the Government should furnish the growers with information on the intentions to plant with the thought that this would lead to a reduction in acreage. This type of information has been available for several years but, while the reports have been remarkably accurate, the results have been disappointing.

We are now considering Government control by making the potato a basic agricultural commodity. Apparently this is the only way by which a real control of production can be effected. The production control act which is soon to be introduced in Congress should have the careful consideration of every potato grower, since if a satisfactory system of controlling production can be developed it should eliminate many of our present difficulties and make it possible for the producer to obtain a fair return on his crop.